

Remarks/Arguments:

This is a reply to the non-final office action of August 9.

The “optional” steps have been deleted from claim 23. We believe this will overcome the object on formal grounds.

In the office action, the examiner rejected the claims presently on file over Alcock (WO 02/31780). That reference was also the principal reference in the international search report. But as one can see, the international search report acknowledged novelty of the claims on file over Alcock – in our opinion correctly. The difference identified between Alcock and the present invention is that Alcock does not teach wide-angle illumination, whereas claim 23 explicitly recites “wherein the illumination in each of steps a) and c) is a wide-angle illumination.”

On page 6 of the specification, it is stated that the wide-angle illumination optics are capable of illuminating the marking simultaneously under a plurality of incidence angles ranging from orthogonal to grazing incidence. This is the general definition of wide-angle illumination: a marking is illuminated simultaneously under a plurality of incidence angles. This can be achieved, for example, by using a plurality of light sources such as diodes. This principle is shown in the prior art, for example in US 6,286,978, Claim 1 of which recites an illumination system capable of providing wide-angle illumination. Such wide-angle illumination is specifically shown in figure 5 of the patent (see also the corresponding description in column 6, lines 26 to 33). A plurality of light sources 40' are oriented such that they can illuminate an object 36 from a great amount of different angles. In other words, not only one or two incidence angles are used for illumination, but rather virtually an entire range of incidence angles is used.

The same can be achieved with many fewer light sources if one uses a specific wide-angle illumination optic such as a compound parabolic concentrator (see page 7 of the present specification). Such a compound parabolic concentrator is described in detail in the present specification with reference to figure 1c. In principle, the wide-angle illumination optic collects the light emitted by a few light sources in such a way that an object lying below the compound parabolic concentrator is indeed supplied with incident light from a virtually entire range of incidence angles.

This is the core concept of the present invention. As explained in the introductory portion of the present application (in particular at pages 4 and 5) the problem with conventional illumination and detection equipment is that the geometry of the light sources and the detection units is fixed. While this is satisfactory for certain types of optically variable devices, it is by no means suitable for illumination and detection of all optical variable devices known in the art. For example, as pointed out at the bottom of page 4 of the present specification, holographic diffraction gratings exhibit different incidence and reflection angles. Such optically variable devices cannot be authenticated with equipment which has been affixed for the detection of, e.g., optically variable interference pigments having about the same incidence and reflection angles.

The problem addressed by the present invention is to provide authentication equipment which is suitable for all kinds of optically variable devices, which is as cheap as possible, and is miniaturizable. The problem has been solved by the present invention with a device using wide-angle illumination. Wide-angle illumination is sometimes called omnidirectional illumination. Just as a wide-angle camera lens admits light from a wide range of angles, a wide-angle illuminator sends light from a wide range of angles. The term “wide-angle” has a commonly understood meaning in the field of illumination. See, e.g., U.S. Patent 6286978.

Alcock does not use wide-angle illumination optics, as has already been acknowledged in the international search report. Rather, Alcock uses a fixed geometry of the illumination and detection devices. In Alcock, the object is illuminated with only one light beam, or possibly two. The beam is not a wide-angle illumination as defined in the present specification and as this term is commonly used in the art.

In applicant's opinion, Alcock does not disclose anything more than WO 01/54077; that document is distinguished from the present invention at pages 4 and 5 of the present application. The same distinctions over WO 01/54077 apply as well to Alcock. In applicant's opinion, the claims presented are novel over Alcock. With respect to the question of obviousness, applicant's position is that Alcock alone does not render obvious the subject matter of the present invention, inasmuch as Alcock is absolutely silent with respect to wide-angle illumination. Alcock suggests his fixed geometry, and nothing more. Thus Alcock's device suffers from the drawbacks discussed with respect to WO 01/54077 on pages 4 and 5 of the present specification. Applicant cannot identify any point in Alcock which would have led the ordinarily skilled person in the direction of the present invention as defined by claim 23.

Applicant also does not believe that a combination of Alcock with DR 20 33 183 (Schroeder) would render obvious the subject matter of claim 23. The examiner cited Schroeder only with respect to certain dependent claims, but not with respect to the main claim 23, but in any event, Schroeder does not suggest any wide-angle illumination and is therefore does not overcome the deficiencies of Alcock.

We therefore believe that claim 23 as now written is patentable over the prior art of record. The claims which depend from claim 23 are also deemed allowable for the subject matter they inherit, taken in combination with the additional limitations presented.

Applicant believes the claims of this application, as amended, distinguish the invention from the references of record, and that the application is now in condition for allowance.

Respectfully submitted,

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